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the elevation by which the erosion of the flaring and benched valleys of the northern Alps has been allowed. The problem involved in the relation of elevation and glaciation would therefore seem to be not the simple one of immediate cause and effect, but on the other hand the difficult one of why the apparently competent cause should not have at once had its expected effect; why glaciation should have waited so long after elevation, not attaining its maximum until a time of depression.

FORESTS AND TORRENTS.

THE much-debated problem of the influence of forests on rainfall remains unproved, after all that has been said and done; but the influence of forests on torrents admits of no question. The soil is washed from the deforested slopes and the torrents spread it over the valleys, greatly to the injury of both high and low land. The Shenandoah Valley, for example, one of the most beautiful and productive farming districts in our country, is suffering along its margin from the encroachments of gravels and sands washed from the enclosing deforested ridges. Those who wish to present this matter to forestry meetings in popular and impressive form will find an abundance of illustrative material with references to European literature on the subject in an essay by Toula: *Ueber Wildbach-Verheerungen and die Mittel ihnen vorzubeugen* (Schr. Vereins zur Verbreitung naturw. Kenntnisse in Wien, xxxii., 1892, 499-622, with forty-one views from photographs).

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NOTES ON AGRICULTURE (III.)

THE EXPERIMENT STATION RECORD.

THE Experiment Station Record, a monthly (practically) published from the office of Experiment Stations of the U. S. Department of Agriculture gives under the heads of Chemistry, Botany, Zoöl-

ogy, Meteorology, Soils, Fertilizers, Field crops, Horticulture, Forestry, Seeds, Weeds, Diseases of Plants, Entomology, Foods, Veterinary Science, Dairying, Technology, Statistics and Miscellaneous, the progress made in these various branches in the Experiment Stations of our country. The recent work in Agricultural Science in foreign countries is also briefly summarized.

From the last issue of the Record, just received, the reader is first of all informed as to the amounts of the appropriations made by Congress for the U. S. Department of Agriculture for the year ending June 30, 1896. The total amount is \$2,578,750, which includes \$720,000 for the Experiment Stations established under the act of Congress of March 2, 1887. There will be two new divisions in the U. S. Division of Agriculture, namely, that of Agrostology, which contemplates 'field and laboratory investigation relating to the natural history, geographical distribution and use of the various grasses and forage plants,' and that of Soils.

Among reports of agricultural science in foreign lands is a paper upon 'Agricultural Investigations in Switzerland,' by Dr. Grete, director of the Swiss Station at Zurich. In 1878 a Station for control of fertilizers and feeding stuffs was established, and recently its work has been extended to include culture tests of soils. There is a Seed Control Station which at the present time has eight workers besides the director, and tests by germination thousands of samples of seeds.

Under the head of chemistry the Record gives the new methods of obtaining solutions in soil analyses and the determination of phosphoric acid. The department of Botany contains a review of Professor Scribner's 'Grasses' of Tennessee, which is a valuable contribution to the Agrostology of the whole country. 'Notes on Maize,' by Dr. Sturtevant, contains generalizations upon the

effect of climate upon corn, the view being maintained that northern grown varieties are not necessarily earlier than southern sorts. The popping of corn is due to the starch lying within a tough layer which bursts upon the application of heat.

Under meteorology winds injurious to crops are considered at length in a digest of Mr. Curtis' bulletin. Three classes of destructive winds are considered, namely, violent, cold and drying winds. Of the cold winds there are two classes, the mountain and valley, and those associated with cyclones, the so-called blizzards and 'northerners,' chiefly destructive to orchard crops. The extent of the latter has increased with the progress of deforestation, and the Michigan peach belt, with its failures in late years, is given as an example. Under 'Variations in the Character of the Seasons,' Mr. Gauthrop shows cause and makes an appeal for the exploration of the upper atmosphere. Mr. Clayton, under 'Rhythm in the Weather,' claims that 'there is good reason to believe that through all this seeming irregularity there runs a web of harmony and rhythm,' and expects that meteorology will in time become an exact science. It is certainly gratifying to note how much attention is being given to the weather and the progress that is made from year to year in its study.

While the air is being investigated the soils are not neglected. In addition to analyses in relation to fertilizers the action of organic acids is reported upon by H. Snyder, of the Minnesota Station. Soil temperatures are taken at many Stations and facts are rapidly accumulated upon soil meteorology as well as the movements of liquids and gases in the soil.

Naturally, a large part of the chemical work of the Experiment Stations is with fertilizers and the record before us gives a full share of its space to this branch of the Station service. The New Jersey Station issues a large bulletin giving the results of

analyses, while the Maine Station reports upon the foraging powers of some agricultural plants for phosphoric acid, as tested by box experiments. The Louisiana Station issues a large bulletin upon the 'Results of five years' experiments with fertilizers.' This is not the place to give conclusions, the point here being for the readers of SCIENCE to realize that experiment work in this country is widespread in the broad sense, and that we are entering an age that has for its watchword, 'Prove all things,' while we may hope that we hold fast to that which is good.

Mr. Crazier, of Michigan, takes up a single somewhat obscure crop, the millet, and with sixty-four pages of text and six figures gives results obtained from seventy-three samples grown under varying conditions. In like manner Mr. Hilgard, of California, brings out the facts concerning the new tannin-producing plant carnaigre. From the same Station is a bulletin upon the Australian salt bush, which grown upon 'some of the most alkali spots yielded at the rate of five tons of dry matter per acre,' and is eaten with relish by live stock. Experiments upon wheat, tobacco, potatoes and several other standard crops receive notice in the Record.

Under Horticulture Mr. Heideman, of the Minnesota Station, gives a 'classification of the sexual affinities of *Prunus Americana* vars. Numerous crosses were made between the various forms of flowers, most of which were not hermaphroditic, and out of forty-nine possible combinations of pollination only 13 were legitimate. Mr. Lodeman, of Cornell, has issued a bulletin upon 'grafting of grapes,' illustrating directions for the various methods and remarking upon the physiology of the process. In his annual report, Mr. Munson, of Maine, gives notes upon various crops. Thus in a cross between *ignotum* and peach tomatoes there was 'a marked falling off in the second generation over the advantage indicated by the first.'

Mr. Buckhout after 'five years' experience in planting forest trees' concludes in the Pennsylvania Station Report "that considering the time, expense and work involved, artificial forest planting cannot be recommended, at least in the way pursued in the experiment and that natural methods of re-foresting supplemented by some seed sowing, thinning and planting will suffice for the present." Mr. McCarthy, of the North Carolina Station, has prepared a bulletin upon seed testing and fully describes its uses and methods. Weeds receive attention from Mr. Wooton, of the New Mexico Station, who figures several of the worst in his Territory.

Under diseases of plants some grape troubles in New York are reported upon by Mr. Lodeman of Cornell. Thus the so-called 'shelling' is ascribed to one or more of four causes, namely, parasites, conditions of vine, of soil, or of atmosphere. An English experimenter shows that finely ground lime 700 pounds per acre will check the club root in turnips. Resin is found by Mr. Webber to be effective in preventing the sooty mould of the orange.

Economic entomology receives consideration under many heads as the damage caused by American locusts, chinch bugs, codling moth, etc. A new saw-fly and pear insect are mentioned and many species are named under beneficial insects. Gas treatment for destroying scale insects is reported upon from California and 'Entomology and Quarantine' is considered.

Much space is given to the consideration of foodstuffs, their analyses, digestibility, etc., the Maine Station perhaps taking the lead in these matters in the copy of the Record in hand, while Utah and Minnesota come in for a share in 'dairy herd records' and 'relative value of corn and oats for horses.' Several papers are mentioned by title or at length under dairying.

Surely enough has been here given to

show that the Experiment Stations of the United States are pushing on along many lines, and that through the facts accumulated principles cannot but be laid bare.

THE HORTICULTURALISTS' RULE-BOOK.

THE first edition of this 'compendium of useful information for fruit-growers, truck-growers, florists and others' by Professor L. H. Bailey, of Cornell University, was published in 1889 and a second in 1892. The great advances made in methods of combating insect and fungous enemies during the past few years led the author to revise and extend his work. A chapter upon greenhouse heating has been added and another upon the current literature of horticulture.

The following are some of the leading subjects considered: insecticides and injurious insects, plant diseases with preventives and remedies; injuries from mice, rabbits and other animals; weeds, seed-tables, etc. There is a chapter upon *Rules* in which are given rules for naming fruit, codes of various societies, etc. Within the flexible covers of this little book the publishers (Macmillan & Co.) have neatly packed together a surprising amount of valuable information. Here the horticulturist may learn how much seed to sow per acre, how many plants to set in his orchard, how to keep off the enemies to his crop, and when to harvest and market it. Not the least is a list of the leading books that have been published upon horticultural subjects and within easy reach of crop growers.

BYRON D. HALSTED.

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THE ILLUSTRATIONS IN THE STANDARD NATURAL HISTORY.

TO THE EDITOR OF SCIENCE—Sir: Referring to the statement in SCIENCE of April 5, 1895, page 387, top of second column, that certain illustrations of Brehm's *Thierleben*